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Professional History and Education

<i>May 2015 - present</i>	CIRES Scientist III University of Colorado/NOAA Chemical Sciences Division Boulder, CO, USA
<i>December 2008 - April 2015</i>	CIRES Scientist II University of Colorado/NOAA Chemical Sciences Division Boulder, CO, USA
<i>August 2007 – December 2008</i>	Research Scientist Max Planck Institute for Meteorology Hamburg, Germany
<i>March 2007 – July 2007</i>	CIRES Scientist I University of Colorado/NOAA Chemical Sciences Division Boulder, CO, USA
<i>March 2006 – February 2007</i>	NRC Research Associate NOAA Chemical Sciences Division Boulder, CO, USA
<i>January 2005 – February 2006</i>	CIRES Scientist I University of Colorado/NOAA Chemical Sciences Division Boulder, CO, USA
<i>November 2002 – October 2004</i>	Advanced Study Program Postdoctoral Fellow National Center for Atmospheric Research Boulder, CO, USA
<i>July 2002 – October 2002</i>	Postdoctoral Fellow Institute of Physics

<i>June 2002</i>	University of Bern, Switzerland PhD, Atmospheric Science Institute of Physics
<i>June 1998 – June 2002</i>	University of Bern, Switzerland PhD Candidate Institute of Physics
<i>May 1998</i>	University of Bern, Switzerland MSc, Theoretical Physics, Mathematics, and Astronomy Institute of Theoretical Physics,
<i>1992 – 1998</i>	University of Bern, Switzerland Undergraduate and graduate student Theoretical Physics, Mathematics, and Astronomy University of Bern, Switzerland

Funded Proposals

<i>2016 – 2017</i>	A novel approach to quantifying the cloud radiative effect in a changing climate using a statistical emulator, NOAA High Performance Computing and Communications Program, \$ 103'259
<i>2012 – 2015</i>	An Investigation of Aerosol-Cloud-Precipitation Interactions in the South-East Pacific Using DOE G-1 Data and WRF/Chem Large Eddy Simulations, DOE Atmospheric Systems Research Program, \$ 344'000
<i>2009 – 2011</i>	Natural and anthropogenic gas phase emissions and cloud properties in the South-East Pacific region, NOAA/NSF, \$ 345'000

Honors and Awards

- National Research Council Research Associate 2006 – 2007
- NCAR Advanced Study Program Postdoctoral Fellow 2002 – 2004
- American Geophysical Union Editors' Citation for Excellence in Refereeing, Geophysical Research Letters, 2014

Expertise

Science and research

- Cloud-climate feedbacks
- Aerosol-cloud interactions
- Boundary layer clouds and dynamics
- Atmospheric chemistry
- Atmospheric aerosol

Model development, simulations, and analysis

- High resolution simulations of boundary layer cloud processes: chemistry, aerosol, microphysics, and dynamics (WRF/Chem, System for Atmospheric Modeling, SAM)
- Mesoscale modeling of chemical, cloud, and aerosol processes (WRF/Chem)

- Detailed box and trajectory modeling of aerosol processes
- Climate modeling (ECHAM-HAM)

Scientific computing

- Development of algorithms for data analysis, statistics, integration of differential equations, and visualization in
 - Fortran
 - Python
 - IDL
 - C
 - Java
- Parallelization with
 - OpenMP
 - MPI

Peer-reviewed Publications

Web of Science statistics:

h index: 14

Sum of times cited without self-citations: 530

Average number of citations per publication: 24.87

23. **Wind speed response of marine non-precipitating stratocumulus clouds over a diurnal cycle in cloud-system resolving simulations**
J. Kazil G. Feingold, and T. Yamaguchi, Atmos. Chem. Phys., 16, 5811-5839, doi:10.5194/acp-16-5811-2016, 2016
22. **Stratocumulus to cumulus transition capped by a light-absorbing smoke layer**
T. Yamaguchi, G. Feingold, J. Kazil, and A. McComiskey, Geophys. Res. Lett., 42, 10478–10485, doi:10.1002/2015GL066544, 2015
21. **On the reversibility of transitions between closed and open cellular convection**
G. Feingold, I. Koren, T. Yamaguchi, and J. Kazil, Atmos. Chem. Phys., 15, 7351-7367, doi:10.5194/acp-15-7351-2015, 2015
20. **Deposition and rainwater concentrations of trifluoroacetic acid in the United States from the use of HFO-1234yf**
J. Kazil, S. McKeen, S.-W. Kim, R. Ahmadov, G. A. Grell, R. K. Talukdar and A. R. Ravishankara, J. Geophys. Res., 109, D19206, doi: 10.1002/2014jd022058, 2014
19. **On the interaction between marine boundary layer cellular cloudiness and surface heat fluxes**
J. Kazil, G. Feingold, H. Wang, T. Yamaguchi, Atmos. Chem. Phys., 14, 61-79, doi:10.5194/acp-14-61-2014, 2014

18. **Numerical issues associated with compensating and competing processes in climate models: an example from ECHAM-HAM**
H. Wan, P. J. Rasch, K. Zhang, J. Kazil, and L. R. Leung, *Geosci. Model Dev.*, 6, 861-874, doi:10.5194/gmd-6-861-2013, 2013
17. **The present-day decadal solar cycle modulation of Earth's radiative forcing via charged H₂SO₄/H₂O aerosol nucleation**
J., Kazil, K. Zhang, P. Stier, J. Feichter, U. Lohmann, and K. O'Brien, *Geophys. Res. Lett.*, 39, L02805, doi:10.1029/2011GL050058, 2012
16. **The regional aerosol-climate model REMO-HAM**
J.-P. Pietikäinen, D.O' Donnell, C. Teichmann, U. Karstens, S. Pfeifer, J. Kazil, R. Podzun, S. Fiedler, H. Kokkola, W. Birmili, C. O'Dowd, U. Baltensperger, E. Weingartner, R. Gehrig, G. Spindler, M. Kulmala, J. Feichter, D. Jacob, A. Laaksonen, *Geosci. Model Dev.*, 5, 1323-1339, doi:10.5194/gmd-5-1323-2012, 2012
15. **The global aerosol-climate model ECHAM-HAM, version 2: sensitivity to improvements in process representations**
K. Zhang, D. O'Donnell, J. Kazil, P. Stier, S. Kinne, U. Lohmann, S. Ferrachat, B. Croft, J. Quaas, H. Wan, S. Rast, and J. Feichter : The global aerosol-climate model ECHAM-HAM, version 2: sensitivity to improvements in process representations, *Atmos. Chem. Phys.*, 12, 8911-8949, doi:10.5194/acp-12-8911-2012, 2012
14. **In situ observations of new particle formation in the tropical upper troposphere: the role of clouds and the nucleation mechanism**
R. Weigel, S. Borrmann, J. Kazil, A. Minikin, A. Stohl, J. C. Wilson, J. M. Reeves, D. Kunkel, M. de Reus, W. Frey, E. R. Lovejoy, C. M. Volk, S. Viciani, F. D'Amato, C. Schiller, T. Peter, H. Schlager, F. Cairo, K. S. Law, G. N. Shur, G. V. Belyaev, and J. Curtius *Atmos. Chem. Phys.*, 11, 9983-10010, 2011
13. **Radon activity in the lower troposphere and its impact on ionization rate: a global estimate using different radon emissions**
K. Zhang, J. Feichter, J. Kazil, H. Wan, W. Zhuo, A. D. Griffiths, H. Sartorius, W. Zahorowski, M. Ramonet, M. Schmidt, C. Yver, R. E. M. Neubert, and E.-G. Brunke, *Atmos. Chem. Phys.*, 11, 7817-7838, 2011
12. **Modeling chemical and aerosol processes in the transition from closed to open cells during VOCALS-REx**
J. Kazil, H. Wang, G. Feingold, A. D. Clarke, J. R. Snider, and A. R. Bandy, *Atmos. Chem. Phys.*, 11, 7491-7514, 2011
11. **Modelling microphysical and meteorological controls on precipitation and cloud cellular structures in Southeast Pacific stratocumulus**
H. Wang, G. Feingold, R. Wood, and J. Kazil, *Atmos. Chem. Phys.*, 10, 6347-6362, 2010
10. **Aerosol nucleation and its role for clouds and Earth's radiative forcing in the aerosol-climate model ECHAM5-HAM**
J. Kazil, P. Stier, K. Zhang, J. Quaas, S. Kinne, D. O'Donnell, S. Rast, M. Esch, S. Ferrachat, U. Lohmann, and J. Feichter, *Atmos. Chem. Phys.*, 10, 10733-10752, doi:10.5194/acp-10-10733-2010, 2010

9. **Aerosol microphysics modules in the framework of the ECHAM5 climate model – intercomparison under stratospheric conditions**
H. Kokkola, R. Hommel, J. Kazil, U. Niemeier, A.-I. Partanen, J. Feichter, and C. Timmreck, *Geosci. Model Dev.*, 2, 97–112, 2009
8. **Tropospheric new particle formation and the role of ions**
J. Kazil, R. G. Harrison, and E. R. Lovejoy, *Space Sci. Rev.*, 137, 241–255, 2008
7. **Relevance of ion-induced nucleation of sulfuric acid and water in the lower troposphere over the boreal forest at northern latitudes**
M. Boy, J. Kazil, E. R. Lovejoy, A. Guenther, and M. Kulmala, *Atmos. Res.*, 90, 151–158, 2008
6. **Hot-air balloon as a platform for boundary layer profile measurements during particle formation**
L. Laakso, T., Grönholm, L. Kulmala, S. Haapanala, A. Hirsikko, E. R. Lovejoy, J. Kazil, T. Kurtén, M. Boy, E. D. Nilsson, and A. Sogachev, I. Riipinen, F. Stratmann, and M. Kulmala, *Boreal Env. Res.*, 12, 279–294, 2007
5. **A semi-analytical method for calculating rates of new sulfate aerosol formation from the gas phase**
J. Kazil and E. R. Lovejoy, *Atmos. Chem. Phys.*, 7, 3447–3459, 2007
4. **Is aerosol formation in cirrus clouds possible?**
J. Kazil, E. R. Lovejoy, E. J. Jensen, and D. R. Hanson, *Atmos. Chem. Phys.* 7, 1407–1413, 2007
3. **Aerosol nucleation over oceans and the role of galactic cosmic rays**
J. Kazil, E. R. Lovejoy, M. C. Barth, and K. O'Brien, *Atmos. Chem. Phys.*, 6, 2006
2. **Tropospheric ionization and aerosol production: A model study,**
J. Kazil and E. R. Lovejoy, *J. Geophys. Res.*, 109, D19206, 2004
1. **The University of Bern Atmospheric Ion Model: Time-dependent modeling of the ions in the mesosphere and lower thermosphere**
J. Kazil, E. Kopp, S. Chabrilat, and J. Bishop, *J. Geophys. Res.*, 108, D14, 4432, 2003

Invited Talks

- **Mesoscale organization, dynamics, aerosol-cloud interactions, and the cloud response to climate change**
Telluride Science Research Center Workshop Aerosols and Clouds: Connections from the Laboratory to the Field to the Globe, Telluride, CO, June 27–July 1, 2016
- **Stratocumulus updrafts as drivers of boundary layer growth and entrainment**
2015 AGU Fall Meeting, San Francisco, CA, USA 14–18 December 2015
- **Cloud climate feedbacks: What cloud-system resolving simulations tell about marine non-precipitating Sc response to wind speed**
2015 ARM/ASR Joint User Facility and Principal Investigators (PI) Meeting, 16–19 March, Vienna, VA, USA
- **Clouds and aerosol nucleation from the cloud-resolved to the global scale**
Michigan Technological University, Houghton, MI, USA, 28 September 2011

- **Chemical, aerosol, and cloud processes in closed and open cells**
Swiss Federal Institute of Technology, Institute for Atmospheric and Climate Science, Zurich, Switzerland, 13 July 2011
- **Chemical, aerosol, and cloud processes in closed and open cells**
Max Planck Institute for Chemistry, Mainz, Germany, 7 July 2011
- **Chemical, aerosol, and cloud processes in closed and open cells**
NOAA ESRL Chemical Sciences Division, Boulder, CO, USA, 22 June 2011
- **The sun, cosmic rays, clouds, and climate - the model perspective**
Eddy Cross-Disciplinary Symposium on Sun-Climate Research, Aspen, CO, USA, 22 October 2010
- **Climate Change - Solar Induced or Man Made? - Climate modeling and cosmic ray influences**
Swedish Research Council, Stockholm, Sweden, 12 May 2009
- **Assessing the response of aerosol nucleation, cloud parameters, and radiative forcing over oceans to variations in galactic cosmic ray intensity**
2005 AGU Fall Meeting, San Francisco, USA, 5–9 December 2005

General Contribution Talks

- **Observed and projected ocean wind speed trends and marine boundary layer clouds**
Kazil, J. and G. Feingold, American Meteorological Society 14th Conference on Cloud Physics, 7–11 July 2014, Boston, MA, USA
- **Observed and projected ocean wind speed trends and marine boundary layer clouds**
Kazil, J. and G. Feingold, 2013 AGU Fall Meeting, San Francisco, CA, USA
- **WRF/Chem study of dry and wet deposition of trifluoroacetic acid produced from the atmospheric degradation of a few short-lived HFCs**
Kazil, J., McKeen, S. A., Kim, S., Ahmadov, R., Grell, G. A., Talukdar, R. K., and Ravishankara, A. R., 2011 AGU Fall Meeting, San Francisco, CA, USA, 5–9 Dec 2011
- **Chemical, aerosol, and cloud processes in closed and open cells**
Kazil, J., G. Feingold, H. Wang, T. Clarke, J. Snider, and A. Bandy, 3rd VOCALS Science Meeting/University of Miami, Miami, FL, USA, 21 March 2011
- **Aerosol buffering of marine boundary layer cloudiness**
Kazil, J., G. Feingold, and H. Wang, 2010 AGU Fall Meeting, San Francisco, CA, USA
- **Is aerosol formation in cirrus clouds possible?**
J. Kazil, E. R. Lovejoy, E. J. Jensen, and D. R. Hanson, AGU 2006 Fall Meeting, San Francisco, USA, 11–15 December 2006
- **Validity of Steady State Representations of Sulfate Aerosol Nucleation in Atmospheric Modeling**
J. Kazil and E. R. Lovejoy, The 80th ACS Colloid and Surface Science Symposium, Boulder, CO, 18–21 June 2006
- **Diurnal changes of the ion densities in the undisturbed mesosphere and lower thermosphere**
J. Kazil, E. Kopp, S. Chabrilat, and J. Bishop, EGS XXVII General Assembly, Nice, France, 21–26 April 2002

- **Methyl cyanide (CH_3CN) in the stratosphere and its validation by means of ion composition models and measurements**
J. Kazil, E. Kopp, and N. Livesey, EGS XXVI General Assembly, Nice, France, 25–30 March 2001
- **The nature and importance of cluster ions in the formation of stratospheric aerosols**
E. Kopp and J. Kazil, EGS XXVI General Assembly, Nice, France, 25–30 March 2001
- **Formation of proton hydrates in the summer high latitude mesopause region**
E. Kopp and J. Kazil, EGS XXVI General Assembly, Nice, France, 25–30 March 2001

Proceedings

- **Relevance of Several Nucleation Theories in Different Environments**
M. Boy, B. Bonn, J. Kazil, E. R. Lovejoy, A. Turnipseed, J. Greenberg, T. Karl, L. Mauldin, E. Kusciuch, J. Smith, K. Barsanti, A. Guenther, B. Wehner, O. Hellmuth, H. Siebert, S. Bauer, A. Wiedensohler, and M. Kulmala, in “Nucleation and Atmospheric Aerosols” 17th International Conference, Galway, Ireland, 2007, pp. 698–701, C. D. O’Dowd, P. E. Wagner (Eds.), Springer, 2008
- **Hot-air Balloon Measurements of Vertical Variation of Boundary Layer New Particle Formation**
L. Laakso, T. Grönholm, S. Haapanala, A. Hirsikko, T. Kurtén, M. Boy, L. Sogacheva, I. Riipinen, M. Kulmala, L. Kulmala, E. R. Lovejoy, J. Kazil, E. Nilsson, and F. Stratmann, in “Nucleation and Atmospheric Aerosols” 17th International Conference, Galway, Ireland, 2007, pp. 698–701, C. D. O’Dowd, P. E. Wagner (Eds.), Springer, 2008
- **Ions of the nighttime mid-latitude E-region: A comparison of measurements and the UBAIM ion model**
J. Kazil and E. Kopp, ESA Symposium on European Rocket and Balloon Programmes and Related Research, St. Gallen, Switzerland, 2–5 June 2003, ESA Symposium Proceedings 530, 2002
- **Proton Hydrates at the High Latitude Summer Mesopause: New Results from the University of Bern Atmospheric Ion Model**
J. Kazil and E. Kopp, Proceedings of the Meeting on mesospheric clouds, Perth, Scotland 19–23 August, 2002 Memoirs of the British Astronomical Association, Vol. 45, 2002

Conference Poster Presentations

- **Shear, vertical moisture transport, and decoupling in the marine stratocumulus-topped boundary layer**
J. Kazil, G. Feingold, and T. Yamaguchi, 2015 AGU Fall Meeting, San Francisco, USA, 14–18 December 2015
- **Modulation of the Wind Speed Response of Marine Stratocumulus Clouds**
J. Kazil and G. Feingold, 2014 AGU Fall Meeting, San Francisco, USA, 15–19 December 2014
- **Particle Formation in the Upper Troposphere as a Source of Aerosol in the Northern mid-Latitudes**
D. Axisa, B. Meland, J. Kazil, J. Reeves, J. Wilson, 2014 AGU Fall Meeting, San Francisco, USA, 15–19 December 2014

- **Atypical cellular cloud structures in the marine boundary layer**
J. Kazil and G. Feingold, 2012 AGU Fall Meeting, San Francisco, USA, 3-7 December 2012
- **Atmospheric lifetimes of neoteric short-lived HFCs against oxidation by the hydroxyl radical, and the resulting dry and wet deposition of trifluoroacetic acid in a WRF/Chem simulation**
J. Kazil, S. McKeen, S.-W. Kim, R. Ahmadov, G. Grell, R. K. Talukdar, and A. R. Ravishankara, 22nd International Symposium on Gas Kinetics, 18 - 22 June 2012, Boulder, Colorado, USA
- **VOCALS/Southeast Pacific Science: Sub-grid scale processes of the marine boundary layer cloud-aerosol system**
J. Kazil and G. Feingold, **World Climate Research Program Open Science Conference, 24-28 October 2011, Denver, CO, USA**
- **Aerosol sources and marine stratocumulus during VOCALS-REx in a WRF/Chem Large Eddy Simulation**
J. Kazil, H. Wang, and G. Feingold, 13th Conference on Cloud Physics, American Meteorological Society, 28 June - 2 July 2010, Portland, Oregon
- **Sulfate aerosol nucleation, primary emissions, and cloud radiative forcing in the aerosol-climate model ECHAM5-HAM**
J. Kazil, J. Quaas, S. Kinne, S. Rast, P. Stier, and J. Feichter, 2007 AGU Fall Meeting, San Francisco, USA, 15-19 December 2008
- **Asian dust and cloud ice over the North Pacific: Comparison of ECHAM5-HAM simulations and PACDEX observations**
J. Kazil, U. Lohman, W. A. Cooper, J. L. Stith, J. Feichter, Y. Peng, and T. Cheng General Assembly 2008, Vienna, Austria, 13-18 April 2008
- **Neutral and charged binary sulfate aerosol formation in the aerosol-climate modeling system ECHAM5-HAM**
J. Kazil and H. Kokkola, 2007 AGU Fall Meeting, San Francisco, USA, 10-14 December 2007
- **Observations of aerosol nucleation in the tropical UT/LS**
J. Curtius, R. Weigel, H.-J. Vössing, A. Minikin, E. R. Lovejoy, J. Kazil, C. Schiller, A. Stohl, and S. Borrmann General Assembly 2006, Vienna, Austria, 2-7 April 2006
- **A parameterization of neutral and ion-induced water / sulfuric acid aerosol nucleation rates for use in atmospheric modeling**
J. Kazil and E. R. Lovejoy, AGU 2005 Fall Meeting, San Francisco, USA, 5-9 December 2005
- **Galactic cosmic rays, solar cycle, and aerosol production in the troposphere**
J. Kazil and E. R. Lovejoy, Living With a Star Science Workshop, Boulder CO, USA, 23-26 March 2004
- **Galactic Cosmic Rays and Ion Induced Aerosol Production**
J. Kazil, E. R. Lovejoy, and L. Desorgher, 2003 AGU Fall Meeting, San Francisco, USA, 8-12 December 2003
- **Ion composition of the nighttime D- and lower E-region: Model results and observations**
J. Kazil, E. Kopp, S. Chabrilat, and J. Bishop, EGS-AGU-EUG Joint Assembly, Nice, France, 6-11 April 2003
- **The University of Bern Ion Model: Time-dependent modeling of the ions in the stratosphere, mesosphere and lower thermosphere**
J. Kazil and E. Kopp, 2001 AGU Fall Meeting, San Francisco, USA, 10-14 December 2001

- **The University of Bern Ion Model: Modeling the mixed $\text{H}^+(\text{H}_2\text{O})_m(\text{CH}_3\text{CN})_n$ clusters in the stratosphere**
E. Kopp, J. Kazil, E. Arijs, and N. Livesey, 2001 AGU Fall Meeting, San Francisco, USA, 10–14 December 2001

Teaching and Education Outreach

- 2009-2010, 2012-2015: WRF-Chem Tutorial instructor, NCAR, Boulder, CO, USA

Professional Service

- Doctoral thesis examiner of Alessandro Franchin (“Extending Fundamental Knowledge on Aerosol Formation by Measuring Sub-3 nm Ions and Particles”), PhD advisor: Prof. Tuukka Petäjä, Division of Atmospheric Sciences, Department of Physics, University of Helsinki, Finland, 2015
- 2016 AGU Fall Meeting session convener and chair - Boundary layer clouds and climate change
- 2015 AGU Fall Meeting session convener - Clouds, Precipitation, and Climate Change
- 2014 AGU Fall Meeting session convener and chair - Warm Boundary Layer Clouds and Climate Change from the Cloud- to the Global Scale
- 2013 AGU Fall Meeting session convener and chair - Wet Scavenging and Deposition: Quantification, Mechanistic Understanding, and Impacts
- 2012 AGU Fall Meeting session convener and chair - Nanoparticles in the Earth’s atmosphere
- 2011 AGU Fall Meeting session chair - Coupled Ocean Atmosphere Land Processes in Tropical Eastern Oceans
- 2007 AGU Fall Meeting session convener and chair - Atmospheric Aerosol Nucleation and New Particle Formation
- Peer reviewer
 - Aerosol Science and Technology
 - Atmospheric Chemistry and Physics
 - Atmospheric Environment
 - Atmospheric Science and Technology
 - Geophysical Research Letters
 - Geoscientific Model Development
 - Journal of the Atmospheric Sciences
 - Journal of Geophysical Research
 - Physical Review Letters
 - Proceedings of the National Academy of Sciences
 - Quarterly Journal of the Royal Meteorological Society
 - Tellus
- Review panel member
 - U.S. Department of Energy (DOE)
 - U.S. National Aeronautics and Space Administration (NASA)
 - U.S. National Science Foundation (NSF)

- U.S. National Oceanic and Atmospheric Administration (NOAA) Climate Program
- European Co-operation in the Field of Science and Technology (COST)
- Academy of Finland

Research history

Dr. Kazil received his PhD in Physics from the University of Bern, Switzerland in 2002, with a thesis on the ion chemistry of the middle atmosphere (The University of Bern Atmospheric Ion Model: Time-Dependent Ion Modeling in the Stratosphere, Mesosphere and Lower Thermosphere). While completing his PhD thesis, Dr. Kazil submitted a research proposal to investigate the connection between the Sun's variability and Earth's climate to the Advanced Study Program at the National Center for Atmospheric Research (NCAR). During the resulting Advanced Study Program fellowship at the NCAR High Altitude Observatory in 2003 and 2004, Dr. Kazil investigated aerosol nucleation, the mechanism by which aerosol particles form from the gas phase, specifically from gas phase ions, which are created in the atmosphere by cosmic rays, and its response to solar variability. This research became the foundation for his later work that yielded the first implementation of the sun-cosmic-ray-cloud interaction in a climate model.

In 2005, Dr. Kazil joined the Cooperative Institute for Research in Environmental Sciences (CIRES) and the National Oceanic and Atmospheric Administration (NOAA) Chemical Sciences Division (CSD) as a Scientist I. He developed, using mathematical methods and laboratory data from experiments at the NOAA Chemical Sciences Division, a fast numerical representation of aerosol nucleation from the gas phase for use in climate models. While working at CIRES and CSD, Dr. Kazil secured a U.S. National Academy of Sciences National Research Council fellowship in 2006 to conduct his research. In collaboration with scientists at the NOAA Chemical Sciences Division, Dr. Kazil developed a numerical model for the study of aerosol nucleation from the gas phase in the atmosphere (Model of Aerosols and Ions in the Atmosphere, MAIA), specifically in and around cirrus clouds. This model provided a theoretical explanation for observations of nanometer-sized aerosol particles in cirrus clouds. Later, Dr. Kazil employed this model in a collaboration with scientists at the Max Planck Institute for Chemistry in Mainz, Germany, to evaluate observations of nanometer-sized aerosol particles in the upper troposphere. This work established, for the first time, a connection between air pollution near the Earth's surface and aerosol nucleation at high altitudes. MAIA is currently used by Prof. James C. Wilson at Denver University and collaborators at NCAR to investigate observed new particle aerosol formation events (aerosol nucleation) in the upper troposphere.

In 2007, Dr. Kazil joined the Max Planck Institute for Meteorology (MPI-M) in Hamburg, Germany as a research scientist, and conducted research on the influence of aerosol nucleation from the gas phase on clouds and climate, and on the effect of the Sun's variability on Earth's climate. He introduced aerosol formation from cosmic-ray produced ions into the MPI-M climate model ECHAM-HAM, and quantified, for the first time, the resulting effect of the 11-year cycle in the Sun's activity on Earth's radiative balance and climate. This result underscored the dominant role of human activity on climate and the limited role of the Sun for Earth's warming observed during the 20th century, and has been cited in the Intergovernmental Panel on Climate Change Fifth Assessment Report on the role of solar variability for Earth's climate.

In 2008, Dr. Kazil returned to the Cooperative Institute for Research in Environmental Sciences of the University of Colorado and NOAA as a Scientist II to conduct research on chemical, aerosol, and cloud processes using high resolution models (large eddy simulations). In this research, he investigated the transition between different cloud types over the oceans, and the resulting effects on chemistry, aerosol particles, and the fluxes of surface sensible and latent heat from the ocean. This research provided fundamental understanding of how clouds affect atmospheric chemistry and aerosol on spatial scales currently not resolved by climate models, and how marine boundary layer clouds interact with the fluxes of sensible and latent heat from the ocean surface.

Independently of his work on marine boundary layer clouds, Dr. Kazil conducted policy-relevant research on hydrofluorocarbon replacement compounds. Dr. Kazil investigated how a new hydrofluorocarbon (HFC) substitute, HFO-1234yf, which is currently introduced by car manufacturers as a replacement for HFC-134a in automobile air conditioning units, will affect rainwater composition in the United States. Unlike HFC-134a, HFO-1234yf has both a low global warming potential and a low ozone depletion potential, owing to a short atmospheric lifetime of several days. However, HFO-1234yf would likely result in much higher concentrations of trifluoroacetic acid (TFA), a mildly toxic substance, in rainwater. TFA would be transported by precipitation and surface runoff into surface water bodies, where high concentrations could adversely affect aquatic organisms. Dr. Kazil used a mesoscale model (WRF-Chem) to calculate future TFA concentrations in rainwater over the United States that would result from replacing HFC-134a with HFO1234yf. The results of this work are relevant for future policy and regulation of HFC substitutes under the Montreal Protocol.

In his most recent work, Dr. Kazil has investigated the response of marine boundary layer clouds to large scale wind speed, motivated by increasing trends in observed ocean surface wind speed in the 20th century. Dr. Kazil elucidated the role of wind speed in driving boundary layer growth and entrainment, and its effect on the diurnal cycle of cloud properties and boundary layer decoupling. This work sets the stage for understanding the action of wind speed on boundary layer clouds as a cloud-climate feedback.

In 2015, Dr. Kazil was promoted to Scientist III at the Cooperative Institute for Research in Environmental Sciences of the University of Colorado and NOAA.